

Application No.09/630,258
Filed: August 1, 2000
TC Art Unit: 2124
Confirmation No.: 7200

AMENDMENT TO THE CLAIMS

1. (Currently Amended) A method for computing ~~an~~ a fast Fourier transform, the method comprising:

(a) receiving a ~~plurality of N~~ time-ordered first data values, ~~said first data values having a total of N data points;~~

(b) sequentially storing in a first memory each of said ~~plurality of N~~ time-ordered first data values in the time-order;

(c) ~~providing~~ storing in a second memory a plurality of twiddle factors ~~stored in sequential locations in a bit reversed order;~~

(d) reading R input butterfly data values of said ~~plurality of N~~ first data values where each of said R butterfly data values are separated by N/R first data values in said plurality of first data values;

(e) performing a radix R butterfly calculation on said R butterfly input data to generate R butterfly output data values;

~~(f) providing R butterfly output data values;~~

(gf) ~~sequentially storing said R butterfly output data values in sequential memory locations of a third memory in the order in which the output data values are used in the calculated calculations in a next stage;~~

(hg) performing said steps (c) - (gf) N/R x 2 times.

2. (Previously Presented) The method as in claim 1 further comprising the steps of:

~~sequentially replacing said plurality of N first data values in said first memory with selected ones of said R butterfly output data said plurality of sequentially stored data stored in said third memory location;~~

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repeating steps (c) - (h) a total of $\log_2(n)$ times.

3. (Original) The method as in claim 1, wherein $R=2$.

4. (Original) The method as in claim 1, wherein said $R=4$.

5. (Currently Amended) ~~An apparatus~~ Apparatus for calculating
a fast Fourier transform, the apparatus comprising:

a first processor stage having an output including:

a first memory for storing containing a plurality of N
time-ordered N-input data values, said ~~plurality of N~~ input data
values being stored sequentially in the ~~time-ordered manner of~~
said N input data values;

a second memory for storing containing a plurality of
twiddle factor values stored in said second memory in a bit-
reversed order;

a third memory for sequentially storing containing a
plurality of output data values ~~in said order calculated;~~ and

a radix R fast Fourier transform calculator coupled to
said first, second, and third memories, said radix R fast Fourier
transform calculator being operative to receive from said first
memory, R selected data values of said N input data values, each
of the ~~R input data values~~ being separated by N/R input data
values, said radix R ~~FFT~~ fast Fourier transform calculator further
being operative to receive at least one twiddle factor value from
said second memory, and said radix R fast Fourier transform ~~FFT~~
calculator further being operative to calculate R output data
values and to write said R output data values ~~sequentially into~~
sequential memory locations of said said third memory; and

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a second processor stage coupled to said output of said first processor stage, wherein said R output data values are stored said third memory in the order said R output data values are used in the ~~calculated~~ calculations in said second processing stage.

6. (Original) The apparatus of claim 5 wherein R equals 2.

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7. (Original) The apparatus of claim 5 wherein R equals 4.

8. (Currently Amended) ~~A digital~~ Digital signal processing apparatus for performing a fast Fourier transform calculation comprising:

a first processor stage having an output and including:

a digital signal processor operative to receive a plurality of ~~N~~ time-ordered first data values, ~~said first data values having a total of N data points;~~

said digital signal processor operative to sequentially store in a first memory each of said plurality of ~~N~~ first data values in the time-order;

said digital signal processor operative to ~~provide~~ store in a second memory a plurality of twiddle factors stored in sequential locations in a bit reversed order;

said digital signal processor operative to read R input butterfly data values of said plurality of ~~N~~ first data values where each of said R input butterfly data values are separated by N/R data points in said plurality of first data values;

said digital signal processor operative to perform a radix R butterfly calculation on said R butterfly input data;

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said digital signal processor operative to provide R butterfly output data values; and

said digital signal processor operative to sequentially store said R butterfly output data values in sequential memory locations of a third memory;

a second processor stage having an input coupled to said output of said first processor stage, wherein said R butterfly output data values are stored in said sequential memory locations in said third memory in the order said R butterfly output data values are used in the calculated calculations in said second processor stage.
